SKY SCOOP

FALL 2001 ISSUE 8

DROUGHT STOPPED IN ITS TRACKS

As May 2001 began, many were wondering if the Ohio Valley region was heading in the direction of another drought. Meteorological data supported such concern, especially for southern Ohio and northern Kentucky. For instance, as of May 15th, 2001, the Cincinnati/ Northern Kentucky International Airport was already reporting a deficit of nearly 8 inches since the first of January. Dayton and Columbus were also reporting precipitation deficits between 3.50 and 4.50 inches. Studies have shown that the lack of sufficient ground moisture in the early spring can lessen the potential for thunderstorm development in the latter parts of spring and summer (as ground moisture is an important source for thunderstorm development). In other words, once a drought begins in the early spring, there is a good chance that it will only worsen with time. Consequently, if sufficient rainfall didn't come soon, a drought was likely in the near future.

Well, the hope of rainfall was answered by the latter part of May, but it arrived with a vengeance.

The period from May 15th through May 21st was marked by heavy rainfall. The weather conditions were favorable for heavy rainfall as a moist airmass was in place. Central Ohio, south central Ohio and northeast Kentucky were affected the most (Columbus, Chillicothe, Portsmouth and Vanceburg areas). Numerous urban flood, flash flood and river flood warnings were issued. Overall, a large part of this region received between 5 and 10 inches of rain during the month of May. Shawnee Hills in Scioto County received 8.35 inches of rain. Bainbridge in Ross County accumulated even more rainfall, tallying an amount of 9.14 inches for the month. The rain deficit had been met or exceeded in many locations, putting to rest the fear of a widespread drought.

July, just like May, provided excessive rainfall, particularly across southwest Ohio and northern Kentucky. The heavy rainfall from July 17th through July 18th was quite an event. A moisture laden atmosphere was in place during the evening of the 17th. An outflow boundary from a thunderstorm complex over central Ohio moved toward the southwestern part of the state. This boundary, in tandem with a developing low level wind maximum, provided the focus for training thunderstorms over the same area, resulting in torrential rains. In fact, thunderstorms produced rainfall amounts of 4 to as much as 6 inches from east central Indiana to southwest and south central Ohio (all within a six hour period). Just like in May, numerous urban flood, flash flood and river flood warnings were issued. In fact, three fatalities occurred in northeast Hamilton County. Two people drowned in their basement while another individual was swept away by a swollen creek near Loveland.

A dangerous situation arose on the Little Miami River at Milford during the early morning hours on the 18th. With a concentration of 5 to 6 inches of rain across the Little Miami River basin (in this instance, encompassing Warren, Clinton, Highland and Clermont

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Inside...

Continued Drought

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counties), the river level at Milford jumped from 4.6 feet at 8 pm EDT on the 17th to a maximum crest of 21.4 feet at about 4 am EDT on the 18th. The river rose 16.8 feet within an eight hour period! The highest stage ever recorded at Milford was 25.5 feet back on March 3rd , 1913. At stages above 21 feet, flooding occurs in low areas between Main Street and the river in Milford itself. The rapid rise in the river was followed by a rapid decline. The river quickly dropped below flood stage around 10 am EDT on the 18th (see graphic on page 3).

Overall, July was an extremely wet month. Some rainfall totals across the region are listed to the right:

By Scott Hickman

LOCATION	AMOUNT (INCHES)
LIBERTY (ADAMS CO.)	7.17
PERINTOWN (CLERMONT CO.)	7.41
CINCINNATI/NORTHERN KENTUCKY INTERNATIONAL AIRPORT (BOONE CO.)	8.70 (5TH WETTEST FOR JULY)
MASON (WARREN CO.)	8.94
BRECON (HAMILTON CO.)	9.06
MIDDLETOWN (BUTLER CO.)	9.53
MOUNT ORAB (BROWN CO.)	10.84
MOSCOW (CLERMONT CO.)	14.14

NEW TABULAR AND GRAPHICAL PRODUCTS ISSUED BY THE NATIONAL WEATHER SERVICE

If you have visited our web site lately, you may have noticed two new forecast products that have been issued from our office since May 2001. The first one is a seven day graphical forecast. The second product, know as the Revised Digital Forecast, is a tabular form of the seven day graphical forecast.

National Weather Service offices across the country will gradually begin issuing these products.

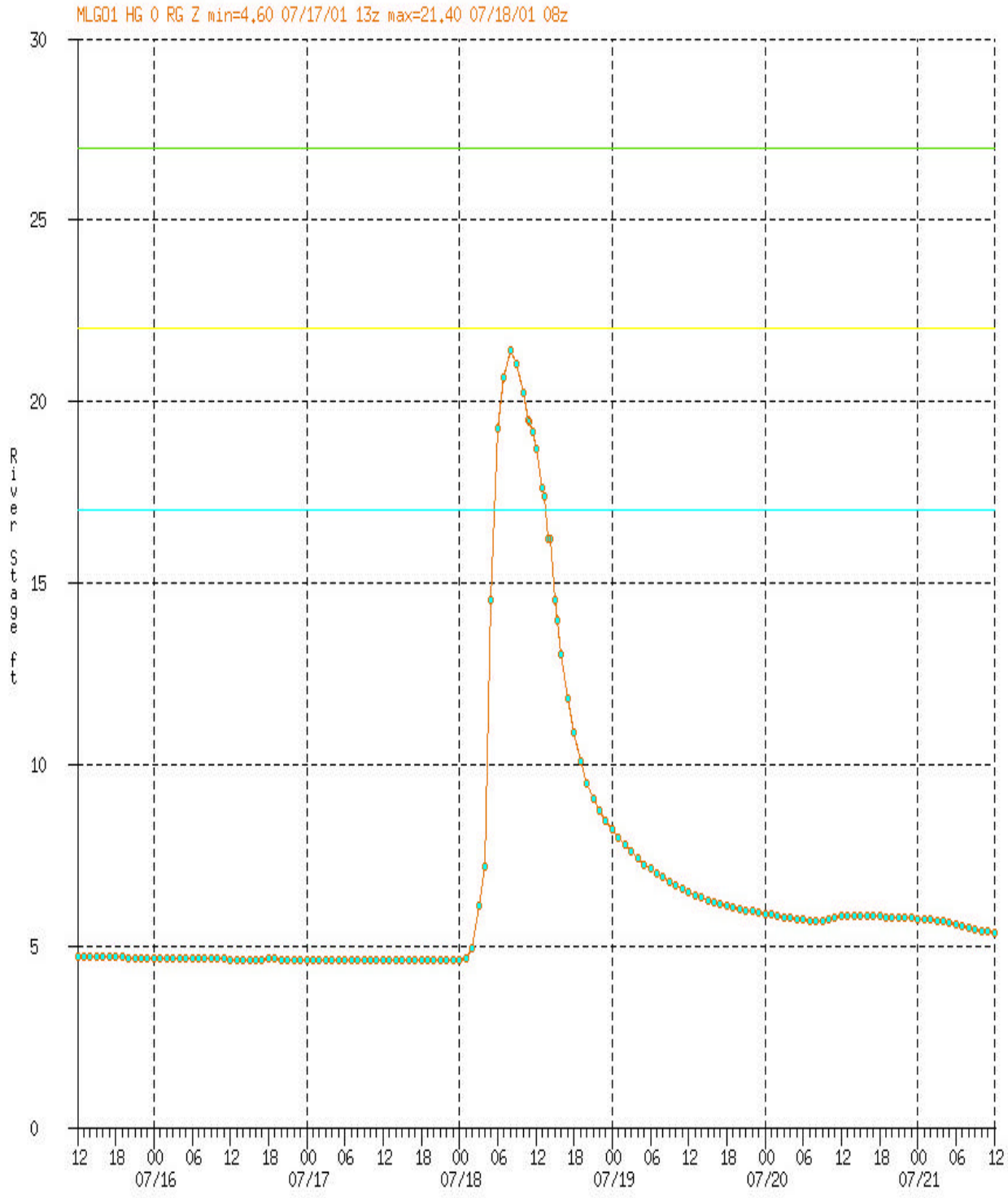
In addition to the traditional text forecast product, the meteorologist is now responsible for creating a forecast database that gives detail temperature, dewpoint, humidity, wind, precipitation etc. for three hourly periods. Eventually, graphical maps depicting the various weather elements at specific times will be created for each office's county warning area.

For more information on the tabular Revised Digital Forecast, visit our web page at: http://www.nws.noaa.gov/er/iln/rdfexplanation.htm and for our graphical products http://www.nws.noaa.gov/er/iln/gfe.htm

To learn more about how the National Weather Service will produce graphical maps from a forecast digital database, visit: http://www-md.fsl.noaa.gov/eft/publications/brochure/brochure.html

By Scott Hickman

THE RAPID RISE OF THE LITTLE MIAMI RIVER AT MILFORD



As one can see from this graph, the Little Miami River at Milford rose rapidly over a short period of time. Since the heavy rainfall was concentrated over a small area and not over the entire Little Miami River Basin, the river dropped rapidly as fast as it rose. The time scale is denoted in Universal Coordinated Time (UTC). To convert to Eastern Daylight Time, you must subtract four hours from the 24 hour clock value.

SEVERE HAIL PUMMELS OHIO ON APRIL 9TH, 2001

On the evening of April 9th, 2001, thunderstorms accompanied by very large and destructive hail traversed across southwest and central Ohio. Widespread hail of a substantial size is rare in the Ohio Valley. This article will focus on the conditions that led to this significant event and the hail sizes that were produced.

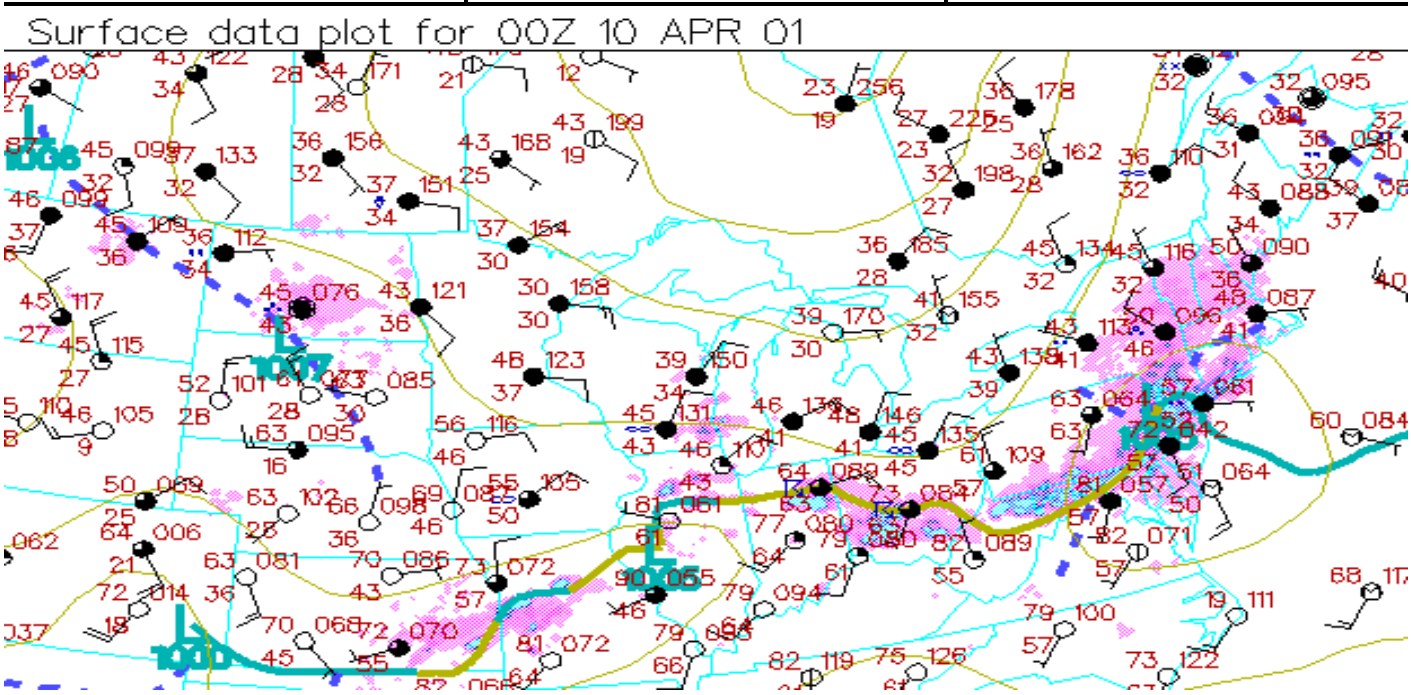
At 700 pm EST on April 9th, a stationary front extended from the mid-Atlantic coast westward across the Ohio Valley and then into the southern Plains. This front separated two areas of high pressure. To the north of the front, temperatures were in the 30s and 40s across northern Ohio and Michigan, while temperatures over southern Ohio and much of Indiana were in the upper 70s. The tremendous temperature gradient along the boundary set the stage for explosive thunderstorm development.

Thunderstorms erupted during the late afternoon hours along the front. Because of the stationary nature of the front, the storms moved across the same areas for several hours. Since the atmosphere in which the storms developed was very unstable and cool aloft, the storms were very efficient hail-producers. Some of the storms even produced wind damage.

Numerous locations received large hail during this event. Butler, Greene, Clinton, Ross, Fayette Darke, Highland and Montgomery counties all received hail golfball size or larger from these storms. The largest report of hail came from Greene county where hail larger than baseballs fell at Yellow Springs. Also, a wind gust to 90 mph occurred at Wright-Patterson Air Force Base in northwest Greene county.

A newspaper report several months later indicated that the city of Kettering alone (eastern Montgomery county) received $70 million dollars in damage to homes and businesses from the large hail.

By Steve Wilkinson



The above map depicts the surface weather conditions at 7 pm EST on April 9th, 2001. Note the strong contrast in Temperatures are indicated by the number to the upper left of the circular station plot. Note the strong contrast in Temperatures from Cleveland, which was 45 degrees, to Cincinnati, which reported a temperature of 79 degrees. Such a strong contrast in airmass depicts a frontal zone as indicated by the line across Ohio. The above weather map was taken from the UNISYS web page of archive surface data located at http://weather.unisys.com/archive/sfc_map.

SEVERE WEATHER SEASON 2001 SUMMARY

Another severe weather season is behind us, and it was a successful one from a spotter participation standpoint. This spring our office conducted 48 spotter training classes across southwest Ohio, southeast Indiana, and northern Kentucky. Almost two thousand people attended these training classes, and half of these people were new additions to the spotter program. The new format of video clips interspersed with still photos was well-received. Thank you for all of your comments and suggestions.

We were pleased to return to a few counties that had not hosted spotter training in nearly five years. The number of spotters in Robertson and Gallatin counties in Kentucky, Union county in Indiana, and Pike county in Ohio were more than tripled as numerous people came out for the training.

More impressive than the excellent turnout for training was the spotter response during key severe weather events. No event stands out more than April 9th. We received numerous spotter reports of large hail, rotating wall clouds and heavy rain which were integral to our severe weather operations that afternoon. As a line of strong storms moved towards the Ohio state line, they intensified. Real-time spotter reports of golf-ball sized hail from Oxford helped us fully realize the strength of these storms. Heavy rains also plagued the area at times this season. We received many helpful rainfall reports which we correlated to radar estimates. This ground truth is valuable to our flood warning decision making process. Kudos spotters!

Your job doesn't end with the close of severe weather season. Winter is just around the corner. Your reports of freezing rain or drizzle, thundersnow, every two inches of new snowfall, and an inch or more of snow in an hour can help us greatly. We are also looking for volunteers to report snowfall after a storm. We would like to find a few people

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ADDITIONAL NOAA WEATHER RADIO TRANSMITTERS COMING TO INDIANA AND KENTUCKY

WFO Wilmington continues to work with federal, state, local agencies and organizations to install three new NOAA Weather Radio stations in Kentucky and Indiana as well as an upgraded transmitter at CVG.

A new and upgraded dual 1000 watts powered transmitter was installed at the Covington, Kentucky location on September 18, 2001. This upgrade will continue to serve northern Kentucky, southwest Ohio and southeast Indiana. The transmitter will increase the broadcast signal to our customers with fewer interruptions in service due to its dual backup capability.

New NOAA Weather Radio stations, with dual 300 watt powered transmitters, are near completion at Maysville (Mason county) and Owenton (Owen county) Kentucky. These new radio stations will provide better broadcast coverage for National Weather Service products (i.e. watches and warnings) across the northern third of Kentucky.

The Maysville (KZZ-49) station has been assigned an operating frequency of 162.425 MHz and will be fully installed before October 31, 2001.

At Owenton (KZZ-48), the station will operate on an assigned frequency of 162.500 MHz and will be fully installed before October 31, 2001.

The initiative to install a new radio station is underway at Richmond (Wayne county), Indiana. The Wayne County Emergency Management Agency Board of Commissioners has approved

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Continued NOAA Weather Radios

(Continued from page 5)

work to begin immediately. A dual 300 watt powered transmitter has been ordered, along with contracts to perform electrical and other works. This site will provide broadcast coverage to the east central third of Indiana.

By Samuel McNeil

this coming year. If any of your information (address, phone number, email address, etc.) has changed, please fill out the form at the back of this newsletter so I can update our database.

Thanks again, spotters, for making this severe weather season a success!

By Shannon White

Continued Severe Weather Summary

(Continued from page 5)

in each county to give us a more complete picture of snowfall across the area. If you are interested, fill out the form at the back of this newsletter and send it to us.

We will begin scheduling next year's training around the first of the year. Check our website (www.nws.noaa.gov/er/iln/iln.htm) for the new training schedule starting in January. Next year we will be incorporating some new video clips and generally freshening up the presentation. If anyone has interesting pictures of storms or cloud formations for possible use in the spotter presentation, send them to our office (Attention: Spotter Program). Remember, if you have not attended a training class in two years, please try to attend one

TIPS FOR MEASURING SNOW: A REPRINT FROM SKY SCOOP ISSUE # 7

Measuring snow may seem like a simple task at a first glance. However, undesired errors may occur in snow measurements if care is not exercised. The following tips should be followed when measuring snow:

1. ***Avoid grassy surfaces.***

Grassy surfaces are usually uneven, and this may lead to inaccurate amounts.

2. ***Measure snow on flat surfaces.***

A flat piece of wood painted white is ideal as this method helps to reflect the sun's rays.

3. ***Choose a location in the shade and away from buildings.***

This will reduce the amount of melting that may occur otherwise.

4. ***Avoid locations susceptible to blowing and/or drifting of snow.***

Sometimes this is unavoidable, but do the best you can.

5. ***Clear an area between measurements.***

During snow events, clear off a portion of your measuring area so you can calculate the amount of snow that has fallen when you take a later measurement.

6. ***Take an average of several depths when measuring snow depth.***

Snow can melt, evaporate and settle, so an average of several readings will give the most accurate depth.

NEW WIND CHILL TEMPERATURE INDEX PLANNED FOR THIS WINTER

The National Weather Service will implement a new Wind Chill Temperature (WCT) index this winter. The reason for the change is to improve upon the current WCT index used by the National Weather Service and the Meteorological Services of Canada, which is currently based on the 1945 Siple and Passel index.

Specifically, the new WCT index will: use wind speed measured at the average height (five feet) of the human body's face instead of the standard anemometer height (33 feet); be based on a human face model; incorporate modern heat transfer theory (heat loss from the body to its surroundings during cold, blustery or windy days); lower the calm wind threshold to 3 mph; use a consistent standard for skin tissue resistance; assume the worst case scenario for the lack of solar radiation (clear night sky).

For example, if you assume an air temperature of 5 degrees and a wind of 30 mph, the old WCT index would yield a temperature of –41 degrees. However, with the new WCT index, the same parameters would yield a temperature of –19 degrees.

National Weather Service forecast offices will adjust the threshold values of WCTs that warrant a Wind Chill Advisory or Wind Chill Warning in order to reflect the new formula.

For the next winter season (2002-2003), adjustments for solar radiation (in other words, the impact of sunshine) for a variety of sky conditions (sunny, partly cloudy and cloudy) will be added to the calculation model.

For complete information on the specific formula used and additional background information, visit our web site at http://www.nws.noaa.gov/er/iln/tables.htm.

By Scott Hickman

New Wind Chill Chart

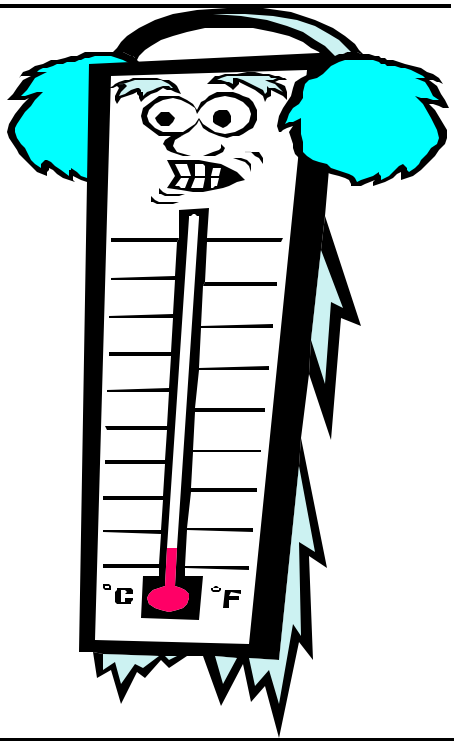
Wind (mph)

Temperature (°F)	Calm	5	10	15	20	25	30	35	40	45	50	55	60
	40	36	34	32	30	29	28	28	27	26	26	25	25
	35	31	27	25	24	23	22	21	20	19	19	18	17
	30	25	21	19	17	16	15	14	13	12	12	11	10
	25	19	15	13	11	9	8	7	6	5	4	4	3
	20	13	9	6	4	3	1	0	-1	-2	-3	-3	-4
	15	7	3	0	-2	-4	-5	-7	-8	-9	-10	-11	-11
	10	1	-4	-7	-9	-11	-12	-14	-15	-16	-17	-18	-19
	5	-5	-10	-13	-15	-17	-19	-21	-22	-23	-24	-25	-26
	0	-11	-16	-19	-22	-24	-26	-27	-29	-30	-31	-32	-33
	-5	-16	-22	-26	-29	-31	-33	-34	-36	-37	-38	-39	-40
	-10	-22	-28	-32	-35	-37	-39	-41	-43	-44	-45	-46	-48
	-15	-28	-35	-39	-42	-44	-46	-48	-50	-51	-52	-54	-55
	-20	-34	-41	-45	-48	-51	-53	-55	-57	-58	-60	-61	-62
	-25	-40	-47	-51	-55	-58	-60	-62	-64	-65	-67	-68	-69
	-30	-46	-53	-58	-61	-64	-67	-69	-71	-72	-74	-75	-76
	-35	-52	-59	-64	-68	-71	-73	-76	-78	-79	-81	-82	-84
	-40	-57	-66	-71	-74	-78	-80	-82	-84	-86	-88	-89	-91
	-45	-63	-72	-77	-81	-84	-87	-89	-91	-93	-95	-97	-98

Frostbite occurs in 15 minutes or less

$$\text{Wind Chill } (^{\circ}\text{F}) = 35.74 + 0.6215T - 35.75(V^{0.16}) + 0.4275T(V^{0.16})$$

Where, T = Air Temperature (°F)
V = Wind Speed (mph)



WINTER IS FAST APPROACHING!!!
REMEMBER TO CONTACT YOUR NWS WITH THE FOLLOWING REPORTS:

1. TWO INCHES OF NEW SNOWFALL

2. ONE INCH OR MORE OF SNOW PER HOUR

3. FREEZING RAIN OR FREEZING DRIZZLE

4. THUNDERSNOW

WILMINGTON NWS SNOWFALL REPORTER APPLICATION

We are looking for spotters who are willing to call in snowfall reports after every winter event.
We will select spotters based on location to try and get a representative view of snowfall across our area.

Name _____

County of Residence _____

Sector of County (NW, SE, etc.) _____

Distance and Direction of your residence from the nearest city, town or U. S. , state or county highway.

_____

_____

Email Address _____

Do you own a rain gauge? **Y** **N**

WILMINGTON NWS SKYWARN SPOTTER REGISTRATION

Name _____

County of Residence _____

Do you need a new ID Card? _____

ONLY FILL OUT PARTS OF SHEET WITH NEW INFORMATION (JUST FILL IN SECTIONS THAT HAVE CHANGED)

If your address has changed, what was your previous county of residence?

_____

Mailing Address _____
street address and/or PO Box apt # (if any)

_____
city state zip

Distance and Direction of your residence from the nearest city, town or U. S. , state or county highway.

_____

_____

Email Address _____

May we call you for verification of suspected severe or hazardous weather events? **Y** **N**

Telephone ___(_____)_____

***** Give times we can call, otherwise we will assume that we can call *anytime day or night*.
Times: From _____ to _____

Affiliation, if any?
Amateur Radio (with Call Sign) _____
Emergency Management/Law Enforcement_____
Fire/Rescue Squad _____

Do you own any of the following weather observing equipment?
Electronic weather station _____
Rain Gauge _____